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TITLE OF THE INVENTION

ELECTRONIC CAMERA SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims benefit of Japanese Applications No. Hei 11-156557 filed in Japan on June 3, 1999 and No. Hei 11-156558 filed in Japan on June 3, 1999, the contents of which are incorporated by this reference.

BACKGROUND OF THE INVENTION

The present invention relates to an electronic camera using a memory card as a recording medium.

For electronic cameras which are being popular in recent years, the image quality, i.e., the number of pixels constructing image data has greatly improved along with development of CCD image sensing elements. Accordingly, the data amount per image data is increasing.

A current electronic camera which uses a memory card with a nonvolatile flash ROM as a mainstream recording medium has a limited recording capacity. For this reason, memory cards with larger capacities have been sequentially developed and are commercially available.

Under these circumstances, an electronic camera having, in place of a memory card, a hard disk device or magneto-optical disk device capable of recording a larger quantity of image data has been proposed.

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However, an electronic camera having a hard disk device or magneto-optical disk device has the following problem. Since the recording medium has a rotating member, power is required to rotate the recording medium for recording/reproduction, and a battery with a larger capacity is indispensable although the recording medium itself can be made compact to some extent and also incorporated in the camera body. As a result, the entire electronic camera becomes so bulky that it is unsuitable for a compact electronic camera which is easy to carry.

BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide an electronic camera selectively usable in accordance with a situation, which allows a user to easily carry only the camera body as a compact electronic camera or sense high-quality image data and record it on a large-capacity recording medium.

According to the first aspect of the present invention, there is provided an electronic camera system comprising a first recording medium receiving portion provided in an electronic camera to receive a first recording medium for recording image data, a second recording medium receiving portion for receiving a second recording medium having a recording capacity larger than that of the first recording medium, a first power supply provided in the electronic

camera to supply power in writing the image data on at least the first recording medium, a second power supply having a power supply capacity larger than that of the first power supply, and an electronic camera expansion unit for receiving the second power supply, the electronic camera expansion unit being detachable from the electronic camera, wherein the second power supply supplies power to write data on the second recording medium when the electronic camera expansion unit is attached to the electronic camera.

According to the second aspect of the present invention, in the invention according to the first aspect, there is provided an electronic camera system further comprising determination means for determining whether the electronic camera expansion unit is attached to the electronic camera, and notification means for, when the second recording medium is inserted into the second recording medium receiving portion, and the determination means determines that the electronic camera expansion unit is not attached to the electronic camera, notifying a user that the electronic camera expansion unit is not attached to the electronic camera.

According to the third aspect of the present invention, in the invention according to the first aspect, there is provided an electronic camera system further comprising determination means for determining

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whether the electronic camera expansion unit is attached to the electronic camera, and means for, when the determination means determines that the electronic camera expansion unit is not attached to the electronic camera, inhibiting drive of the second recording medium and a write/read of image data.

According to the fourth aspect of the present invention, in the invention according to the first aspect, there is provided an electronic camera system wherein the electronic camera expansion unit comprises a grip portion incorporating the second power supply, and a substantially plate-like flat portion having an end face integrated with the grip portion, and attached to a bottom surface of the electronic camera.

According to the fifth aspect of the present invention, in the invention according to the first aspect, there is provided an electronic camera system wherein the electronic camera further comprises a first power supply receiving portion for receiving the first power supply, the electronic camera expansion unit further comprises a unit main body, a second power supply receiving portion for receiving the second power supply, an attaching mechanism for detachably attaching the unit main body to the electronic camera, and data connection means, electrically connected to the electronic camera, for transmitting/receiving the image data, and the second recording medium receiving portion

is provided in the unit main body.

According to the sixth aspect of the present invention, in the invention according to the first aspect, there is provided an electronic camera system wherein the unit main body comprises a grip portion incorporating the second power supply receiving portion and arranged on an end portion side in a horizontal direction of the electronic camera, and a substantially plate-like flat portion integrated with an end portion of the grip portion and attached to a bottom surface of the electronic camera, and incorporating the second recording medium receiving portion and having the data connection means formed at an abutment portion against the bottom surface of the electronic camera.

According to the seventh aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the second recording medium has a rotating member, and the second recording medium receiving portion is arranged on a side of the grip portion of the flat portion.

According to the eighth aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the flat portion has, at a position separated from the grip portion via the second recording medium receiving portion, a circuit section for executing

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the write/read of the image data on/from the second recording medium and transmission/reception of the image data through the connection means by power supplied from the second power supply.

5 According to the ninth aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the electronic camera has a cover for protecting an insertion port of the first recording medium into the first recording medium receiving portion, and the grip portion has a recessed portion not to impede opening/closing the cover.

10 According to the 10th aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the grip portion has, at an upper portion, a release switch for instructing a release operation in the electronic camera.

15 According to the 11th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system wherein the second recording medium can be freely removed from the second recording medium receiving portion, and the second recording medium receiving portion is arranged at a portion where the second recording medium can be removed even while the unit main body is being attached to the electronic camera.

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According to the 12th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system wherein the attaching mechanism has a screw threadably engaging with a tripod screw hole of the electronic camera, and the connection means has a plurality of contacts disposed on a circumference centered on the screw.

According to the 13th aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the flat portion has, at positions corresponding to the plurality of contacts forming the connection means, a circuit section for executing the write/read of the image data on/from the second recording medium and transmission/reception of the image data through the connection means by power supplied from the second power supply.

According to the 14th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system wherein the unit main body further comprises a switch for inhibiting the write/read of the image data on/from the second recording medium.

According to the 15th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system

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camera expansion unit to the electronic camera, and
a first power supply receiving portion for receiving
the first power supply, and the electronic camera
expansion unit comprises the second recording medium
5 receiving portion, a second power supply receiving
portion for receiving the second power supply,
an attaching mechanism for attaching a unit main
body of the electronic camera expansion unit to
the electronic camera, and connection means,
10 electrically connected to the electronic camera,
for transmitting/receiving the image data.

According to the 19th aspect of the present
invention, in the invention according to the 18th
aspect, there is provided an electronic camera system
15 wherein the attaching mechanism has, on an abut surface
against the electronic camera, a projecting portion for
positioning the electronic camera, and the detection
means is arranged at a position corresponding to the
projecting portion to detect that the projecting
20 portion abuts.

According to the 20th aspect of the present
invention, in the invention according to the first
aspect, there is provided an electronic camera system
wherein the first recording medium comprises a memory
25 card, and the second recording medium comprises a hard
disk.

Additional objects and advantages of the invention

will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and
5 obtained by means of the instrumentalities and combinations particularly pointed out hereinafter.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated in and constitute a part of the specification,
10 illustrate presently preferred embodiments of the invention, and together with the general description given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention.

15 FIG. 1A is a perspective view showing the camera body of an electronic camera according to the first embodiment of the present invention.

FIG. 1B is a perspective view showing a state wherein an external unit is attached to the camera body
20 in the first embodiment.

FIG. 2A is a bottom view showing the camera body of the electronic camera according to the first embodiment.

25 FIG. 2B is a view showing the card slot of the camera body of the electronic camera according to the first embodiment.

FIG. 3A is a perspective view showing the external

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FIG. 14 is a perspective view showing an electronic camera system according to the third embodiment of the present invention in which

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FIG. 20 is a flow chart for explaining operation of the electronic camera system according to the second embodiment of the present invention.

FIG. 21 is a flow chart for explaining operation of the electronic camera system according to the fourth embodiment of the present invention.

FIG. 22 is a flow chart for explaining operation of the electronic camera system according to the fourth embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

<First Embodiment>

FIGS. 1A to 5 are views showing an electronic camera 10 according to the first embodiment of the present invention. The electronic camera 10 comprises a camera body 20 and external unit 40.

As shown in FIG. 1A, a front surface 20a of the camera body 20 has an image sensing lens 21, an objective portion 22 of an optical viewfinder, an electronic flash 23, and a concave nail mark 29 as a hook position for opening a media slot cover 26 (to be described later).

A side surface 20b of the camera body 20 has a card slot (first recording medium receiving portion) 24, a card slot (second recording medium receiving portion) 25, and the media slot cover 26 covering the card slots 24 and 25, as shown in FIG. 2B. The card slots 24 and 25 are designed to freely detachably receive a memory card (first recording medium) M having a storage capacity of, e.g., 8 MB and an HDD pack H having a larger storage capacity of, e.g., 350 MB

than that of the memory card M, respectively. The HDD pack H uses a disk-like storage member as a recording medium.

5 An upper surface 20c of the camera body 20 has a release switch 27, and an LCD panel (notification means) 28 for indicating the state of the electronic camera 10 and the number of sensed images.

10 A bottom surface 20d of the camera body 20 has electric contacts 31 connected to connecting pins 58 (to be described later), a hole portion 32 for receiving a positioning pin 52 (to be described later), and a tripod screw hole 34, as shown in FIG. 2A. A battery cover 35 which is opened to exchange the battery is provided on the camera bottom surface 15 20d on the electronic flash side.

20 The camera body 20 incorporates a battery chamber for accommodating, inside the battery cover 35, a battery B (first power supply) for supplying power to the entire camera body 20, a detection switch (detection means) 33 which is provided inside the hole portion 32 and turned on when the positioning pin 52 is inserted, and a control circuit board 36 connected to the detection switch 33 to detect connection/disconnection of the external 25 unit 40. The control circuit board 36 also detects insertion/removal of the memory card M or HDD pack H into/from the card slot 24 or 25 and controls contents

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displayed on the LCD panel.

As shown in FIGS. 3A and 3B, the external unit 40 comprises a plate-like flat portion 50 formed in correspondence with the bottom surface 20d of the camera body 20, and a grip portion 60 integrated with an end portion of the flat portion 50 and provided on the front surface 20a close to the side surface 20b of the camera body 20.

The flat portion 50 incorporates a circuit board 51. The upper surface of the flat portion 50 has the positioning pin 52 for fixing the connection position to the camera body 20, a tripod screw 53 threadably engaging with the tripod screw hole 34 of the above-described camera body 20, and the four connecting pins 58 electrically connected to the electric contacts 31 on the camera body 20 side.

As shown in FIG. 4, each connecting pin 58 has a flange portion 58a, and a distal end portion 58b inserted into a hole portion 55 formed in the upper surface of the flat portion 50. A compression coil spring 57 coaxial with the connecting pin 58 is inserted between the flange portion 58a and a convex portion 56 formed at a position opposing the hole portion 55 of the flat portion 50. Hence, the distal end portion 58b of the connecting pin projects from the upper surface of the flat portion 50 by a predetermined amount.

The external unit 40 is attached by screwing the tripod screw 53 of the flat portion 50 into the tripod screw hole 34 of the camera body 20. At this time, the distal ends of the connecting pins 58 abut against the electric contacts 31, and the connecting pins 58 are pressed downward against the spring force of the compression springs 57. Since the connecting pins 58 and electric contacts 31 are brought into contact with each other at predetermined pressure, power from the large-capacity battery pack 61 and a release signal from the release switch 62 are reliably supplied to the camera body 20 side.

In attaching the external unit 40, the positioning pin 52 is inserted into the hole portion 32 to turn on the detection switch 33. Thus, the control circuit board 36 as a control section in the camera body detects that the external unit 40 is attached.

When the HDD pack H is inserted into the card slot 25 while the external unit 40 is not attached, the detection switch 33 is not turned on. The control section 36 blinks, on the LCD panel 28, "OP BAT" as an alarm indicator 28b of an optional battery, thereby prompting the user to attach the external unit 40. An indicator 28a indicates, e.g., the minimum number of sensible images (26 in this case) for the currently set image quality. If the external unit 40 is not attached, use of the HDD pack H is inhibited to

suppress consumption of the battery B. More specifically, rotation of the disk-like storage member in the HDD pack H and image data write/read are inhibited.

5 FIG. 7 is a block diagram showing the schematic arrangement of hardware of the electronic camera according to the first embodiment. The same reference numerals as in FIGS. 1A to 6 denote the same parts in FIG. 7, and a detailed description thereof will be
10 omitted.

 Referring to FIG. 7, a CPU 201 controls the entire camera 20. A memory card detection section 202 and HDD
15 pack detection section 203 detect the memory card inserted into the card slot 24 and the HDD pack inserted into the card slot 25, respectively, and
 output a detection signal to the CPU 201.

 A controller 204 controls the data read/write from/to the memory card inserted into the card slot 24
20 or the HDD pack inserted into the card slot 25 on the basis of a command from the CPU 201. The CPU 201 and controller 204 are mounted on the control circuit
 board 36.

 As shown in FIG. 7, the battery pack 61 stored in the external unit 40 supplies power for driving the HDD
25 to the camera body 20 when the external unit 40 is attached to the camera body 20.

 Operation of the above-described electronic camera

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will be described below with reference to a flow chart shown in FIG. 8.

The CPU 201 determines first on the basis of a detection signal from the HDD pack detection section 203 whether the HDD pack is inserted into the card slot 25 (S1). If NO in step S1, it is determined next whether the memory card is inserted (S2). The memory card is detected on the basis of a detection signal from the memory card detection section 202.

If NO in step S2, i.e., when neither the memory card nor the HDD pack is inserted, the flow returns to step S1. If YES in step S2, the flow advances to an image sensing sequence (S3).

If YES in step S1, it is determined next whether the external unit is attached (S4). If YES in step S4, the flow advances to the image sensing sequence in step S3.

If NO in step S4, the CPU 201 displays "OP BAT" on the LCD panel 28, as shown in FIG. 6 (S5). Whether the external unit is attached is determined on the basis of a detection signal from the detection switch 33.

The CPU 201 instructs the controller 204 to inhibit use of the HDD (S6). Thus, a write/read to/from the HDD is not performed, and power consumption can be saved.

As described above, in the electronic camera 10 according to the first embodiment, when the HDD pack H

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with large power consumption is inserted, the external unit 40 incorporating the large-capacity battery pack 61 need indispensably be attached. If the external unit 40 is not attached, the user is notified of it on the LCD panel 28 and prompted to attach the external unit 40.

If the external unit 40 is not attached while the HDD pack H is inserted, the function of the HDD pack H is stopped to avoid large consumption of the battery B.

In addition, since the grip portion 60 which is gripped in place of the camera body 20 when the external unit 40 is attached is provided, and the battery pack 61 as a heavy object is incorporated in the grip portion 60, the weight unbalance of the portable camera can be prevented.

The present invention is not limited to the above embodiment, and various changes and modifications can be made without departing from the spirit and scope of the present invention.

According to the electronic camera of the present invention, the following effects are obtained.

(1) When the second recording medium with large power consumption is inserted, the external unit incorporating the second power supply need indispensably be attached. If the external unit is not attached, the user is notified of it and prompted to attach the external unit.

5 The flat portion 350 incorporates an HDD pack
receiving portion (second storage medium receiving
portion) 351, and a circuit board 352 arranged on
the opposing side of the grip portion 360 via the HDD
pack receiving portion 351. The upper surface of the
10 flat portion 350 has the positioning pin 353, a tripod
screw (attaching mechanism) 354 threadably engaging
with the tripod screw hole of the above-described
electronic camera 320, and the eight connecting
pins 356 provided near the circuit board 352.

The HDD pack receiving portion 351 comprises a housing 351a, a connector 351b connected to the connector Hb of the HDD pack H, a support portion 351c for supporting the case Ha of the HDD pack H, projecting portions 351d provided in the housing 351a and engaged with engaging portions 351f (to be

described later), a protective cover 351e for protecting the HDD pack receiving portion 351, and the engaging portions 351f provided in the protective cover 351e and engaged with the above-described projecting portions 351d.

The protective cover 351e of the HDD pack receiving portion 351 allows the user to exchange the HDD pack H even when the expansion unit 340 is attached to the electronic camera 320.

As shown in FIG. 12B, each connecting pin 356 has a flange portion 356a, and a distal end portion 356b inserted into a hole portion 355a formed in the upper surface of the flat portion 350. A compression spring 355c coaxial with the connecting pin 356 is inserted between the flange portion 356a and a convex portion 355b formed at a position opposing the hole portion 355a of the flat portion 350. Hence, the distal end portion 356b of the connecting pin 356 projects from the upper surface of the flat portion 350 by a predetermined amount.

The connecting pins 356 have a function of electrically connecting the circuit board 352 to the control circuit board 336 of the electronic camera 320 and supplying power from the battery pack 361 to the electronic camera 320. When the connecting pins 356 and circuit board 352 are close to each other, the wire leading distance can be minimized.

The flat portion 350 has a DC inlet 357 connected to an external DC power supply such as an AC adapter, and an HDD switch 358 for turning on/off operation of the HDD pack H.

5 The grip portion 360 has an outer shape easily gripped by the user. The grip portion 360 incorporates a battery pack (second power supply) 361. An upper surface 360a of the grip portion 360 has a release switch 362. A side surface 360b of the grip portion
10 360 has a recessed portion 363. The recessed portion 363 allows the user to open/close the media slot cover 326 even when the expansion unit 340 is attached to the electronic camera 320.

15 Even when the expansion unit 340 is attached to make it hard to operate the release switch 327 of the electronic camera 320, the same operability can be obtained because the grip portion 360 has the release switch 362.

20 The electronic camera system 310 with the above arrangement is used in the following way. The electronic camera system 310 performs two operations: "normal mode" and "expansion mode". When the expansion unit 340 is not attached, the "normal mode" is set to sense an image like an ordinary
25 electronic camera.

 When the expansion unit 340 is attached, the "expansion mode" is set. The expansion unit 340

arrangement of hardware of the electronic camera system according to the second embodiment of the present invention. The same reference numerals as in FIGS. 9A to 13 denote the same parts in FIG. 18, and a detailed description thereof will be omitted.

Referring to FIG. 18, a CPU 501 of the electronic camera 320 controls the entire electronic camera 320. A memory card detection section 502 detects the memory card inserted into the card slot 325 and outputs a detection signal to the CPU 501.

A controller 503 controls the read/write from/to the memory card inserted into the card slot 325 on the basis of a command from the CPU 501. The CPU 501 and controller 503 are mounted on the control circuit board 336.

A CPU 511 of the expansion unit 340 controls the entire expansion unit 340. More specifically, the CPU 511 controls the write/read to/from the HDD inserted into the HDD pack receiving portion 351 and transmission of image data read out from the HDD to the electronic camera 320.

Image data read out from the HDD and control commands are transmitted through terminals 371 of the electronic camera 320 and terminals 372 of the expansion unit 340.

A controller 512 controls the HDD pack on the basis of a control command from the CPU 511.

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If NO in step S11, it is determined whether the memory card is inserted (S12). If YES in step S12, the flow advances to the normal mode (S13) and then returns to step S11.

If NO in step S12, a message representing that no medium is inserted is displayed (S14), and the flow returns to step S11.

5 Inhibition of recording in the HDD has been described above. Instead, use of the HDD may be inhibited by inhibiting a read from the HDD.

As described above, in the electronic camera system 310 according to the second embodiment, the stand-alone electronic camera 320 can be easily carried
10 as a compact electronic camera. In addition, when the expansion unit 340 is attached to the electronic camera 320, the number of recordable images can be largely increased, and the electronic camera can be selectively used in accordance with requirements of
15 a situation: for example, high-quality image data can be sensed and recorded on a large-capacity recording medium in the expansion unit 340, or the continuous operable time is prolonged.

In addition, since the grip portion 360 which is
20 gripped in place of the electronic camera 320 when the expansion unit 340 is attached is provided, and the battery pack 361 as a heavy object is incorporated in the grip portion 360, the weight unbalance of the portable camera can be prevented.

25 Furthermore, when the HDD pack H having a rotating member easily affected by vibration is located on the grip portion 360 side where displacement due to

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the same effects as those of the above-described electronic camera system 310.

<Fourth Embodiment>

FIGS. 15A to 17B are views showing an electronic camera system 380 according to the fourth embodiment of the present invention. The same reference numerals as in FIG. 9 denote the same functional parts in FIGS. 15A to 17B.

The electronic camera system 380 comprises an electronic camera 390 and expansion unit 400.

A rear surface 390e of the electronic camera 390 has an eyepiece portion 392 of an optical viewfinder, as shown in FIG. 15A. An image quality selection switch 395 has two positions "HQ" and "NORMAL" which represent high-quality image recording in a memory card M and normal-quality image recording in the memory card M, respectively.

The electronic camera 390 incorporates a control circuit board 336 for controlling the entire electronic camera system 380, and a battery chamber (first power supply receiving portion) having a battery (first power supply) B for supplying power to the electronic camera 390. In the control circuit board 336, connection/disconnection of the expansion unit 400 is detected by a detection switch 333.

As shown in FIGS. 16A to 17B, the expansion unit 400 comprises a plate-like flat portion 410 formed

along a bottom surface 390d of the electronic camera 390, and a pair of grip portions 420 and 430 integrated with one end portion of the flat portion 410 and arranged to sandwich the electronic camera 390.

5 The flat portion 410 incorporates an HDD pack receiving portion (second storage medium receiving portion) 411, and a circuit board 352 arranged on an opposing side of the HDD pack receiving portion 411 via the pair of grip portions 420 and 430. The upper
10 surface of the flat portion 410 has a positioning pin 353, a tripod screw (attaching mechanism) 354 threadably engaging with a tripod screw hole 334 of the above-described electronic camera 390, and connecting pins 356 provided near the circuit
15 board 352.

 The flat portion 410 has a DC inlet 357 connected to an external DC power supply such as an AC adapter.

 The grip portions 420 and 430 have an outer shape easily gripped by the user. The grip portions 420
20 and 430 incorporate battery packs (second power supplies) 421 and 431, respectively, to increase the power supply capacity.

 An upper surface 420a of the grip portion 420 has a release switch 422.

25 Even when the expansion unit 400 is attached to make it hard to operate the release switch 327 of the electronic camera 390, the same operability can be

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obtained because the grip portion 420 has the release switch 422.

An image quality selection switch 432 is attached to the rear side of the grip portion 430. The image quality selection switch 432 has four positions "HQ", "NORMAL", "EXT HQ", and "EXT NORMAL" which represent high-quality image recording in a memory card M, normal-quality image recording in the memory card M, high-quality image recording in an HDD pack H, and normal-quality image recording in the HDD pack H, respectively.

The electronic camera system 380 with the above arrangement is used in the following way. The electronic camera system 390 performs two operations: "normal mode" and "expansion mode". When the expansion unit 400 is not attached, the "normal mode" is set to sense an image like an ordinary electronic camera.

When the expansion unit 400 is attached, the "expansion mode" is set. The expansion unit 400 is attached by screwing the tripod screw 354 of the flat portion 410 into the tripod screw hole 334 of the electronic camera 390. At this time, the positioning pin 353 is inserted into the electronic camera 390 from the hole portion 332 to turn on the detection switch 333. Thus, the control circuit board 336 detects that the expansion unit 400 is attached, and

the "expansion mode" is set.

When the distal ends of the connecting pins 356 abut against the contacts 331, the connecting pins 356 are pressed downward against the spring force of the compression springs 357. The connecting pins 356 and contacts 331 come into contact at a predetermined contact pressure. Hence, power is reliably supplied from the battery packs 421 and 431 to the electronic camera 390 side, and the circuit board 352 and control circuit board 336 are reliably connected to enable transmission/reception of image data or release signal. The image quality in recording and selection of the recording medium are switched by the image quality selection switch 432.

FIGS. 21 and 22 are flow charts for explaining operation of the electronic camera system according to the fourth embodiment of the present invention.

As shown in FIG. 21, first, it is determined whether the expansion unit is attached (S31). If NO in step S31, it is determined next whether the memory card is inserted (S32).

If NO in step S32, neither the memory card nor the HDD pack is inserted, so a message representing that no medium is inserted is displayed on the LCD (S40), and the flow returns to step S31.

If YES in step S32, the flow advances to the normal mode (S33) to determine whether the release is

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If YES in step S54, a normal-quality image is recorded on the memory card (S55), and the flow returns

to step S31. If NO in step S54, it is determined next whether the image quality selection switch indicates "EXT HQ" (S56).

5 If YES in step S56, a high-quality image is recorded on the HDD (S57), and the flow returns to step S31. If NO in step S56, it is determined next whether the image quality selection switch 432 designates "EXT NORMAL" (S58).

10 If YES in step S58, a normal-quality image is recorded on the HDD (S59), and the flow returns to step S31. If NO in step S58, an error message is displayed on the LCD (S60).

15 As described above, the electronic camera system 380 according to the fourth embodiment can also obtain the same effects as those of the above-described electronic camera system 310.

20 When the expansion unit 400 also has the image quality selection switch 432, the quality of an image to be recorded can be switched, and the medium to record can be selected with the same operability as for the stand-alone electronic camera 390. When "HQ" or "NORMAL" is selected, recording in the HDD pack H is stopped. Hence, the expansion unit is used only as an expansion power supply for supplying power from the
25 battery packs 421 and 431 to the electronic camera 390. In addition, this system can cope with continuous image sensing for an enormous number of images because

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separated from the grip, where displacement due to swing of the electronic camera is large, the remaining members easily affected by vibration can be laid out close to the grip. Hence, the influence of vibration caused by camera shake can be minimized.

Since the grip portion has a recessed portion, insertion/removal of the first recording medium is not impeded, and the operability does not degrade even when the expansion unit is attached.

Even when the expansion unit is attached to make it hard to operate the release switch of the electronic camera, the same operability can be obtained because the grip portion has the release switch.

Even when the expansion unit is being attached to the electronic camera, the second recording medium with a large capacity can be exchanged.

When the screw as an attaching mechanism is threadably engaged with the electronic camera to attach the expansion unit to the electronic camera, an appropriate contact pressure can be obtained for connection means, and image data can be reliably transmitted/received.

When the circuit section for controlling operation by the connection means and second recording medium is located at a position corresponding to the connection means, the wire leading distance can be minimized.

When a switch for inhibiting operation of

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determination means for determining whether said electronic camera expansion unit is attached to

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5. A system according to claim 1, wherein the electronic camera further comprises

7. A system according to claim 6, wherein
said second recording medium has a rotating
member, and

5 said second recording medium receiving portion is
arranged on a side of said grip portion of said flat
portion.

10 8. A system according to claim 6, wherein said
flat portion has, at a position separated from said
grip portion via said second recording medium receiving
portion, a circuit section for executing the write/read
of the image data on/from the second recording medium
and transmission/reception of the image data through
said connection means by power supplied from said
second power supply.

15 9. A system according to claim 6, wherein
the electronic camera has a cover for protecting
an insertion port of the first recording medium into
said first recording medium receiving portion, and
20 said grip portion has a recessed portion not to
impede opening/closing said cover.

10. A system according to claim 6, wherein said
grip portion has, at an upper portion, a release switch
for instructing a release operation in the electronic
camera.

25 11. A system according to claim 5, wherein
the second recording medium can be freely
removed from said second recording medium receiving

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portion, and

said second recording medium receiving portion is arranged at a portion where the second recording medium can be removed even while said unit main body is being attached to the electronic camera.

12. A system according to claim 5, wherein

said attaching mechanism has a screw threadably engaging with a tripod screw hole of the electronic camera, and

said connection means has a plurality of contacts disposed on a circumference centered on said screw.

13. A system according to claim 6, wherein said

flat portion has, at positions corresponding to the plurality of contacts forming said connection means, a circuit section for executing the write/read of the image data on/from the second recording medium and transmission/reception of the image data through said connection means by power supplied from said second power supply.

14. A system according to claim 5, wherein

said unit main body further comprises a switch for inhibiting the write/read of the image data on/from the second recording medium.

15. A system according to claim 5, wherein said

unit main body further comprises an input terminal for supplying external DC power to said power supply.

16. A system according to claim 6, wherein said

grip portion has a pair of members sandwiching the electronic camera from a front side and rear side, each of said pair of members having said second power supply receiving portion.

5 17. A system according to claim 16, wherein
the electronic camera has, on a rear surface side,
a first image quality selection switch for switching
an image quality,

10 one of said pair of members, which is located
on the rear surface side of the electronic camera,
covers said first image quality selection switch, and
has a second image quality selection switch having
an image quality selection position for simultaneously
15 instructing priority recording on the second recording
medium.

18. A system according to claim 1, wherein
the electronic camera comprises
detection means for detecting an attached state of
said electronic camera expansion unit to the electronic
20 camera, and

a first power supply receiving portion for
receiving said first power supply, and
said electronic camera expansion unit comprises
the second recording medium receiving portion,
25 a second power supply receiving portion for
receiving said second power supply,
an attaching mechanism for attaching a unit main

body of said electronic camera expansion unit to
the electronic camera, and

connection means, electrically connected to the
electronic camera, for transmitting/receiving the image
data.

19. A system according to claim 18, wherein
said attaching mechanism has, on an abut surface
against the electronic camera, a projecting portion for
positioning the electronic camera, and

said detection means is arranged at a position
corresponding to the projecting portion to detect that
the projecting portion abuts.

20. A system according to claim 1, wherein the
first recording medium comprises a memory card, and the
second recording medium comprises a hard disk.

FIG. 2A

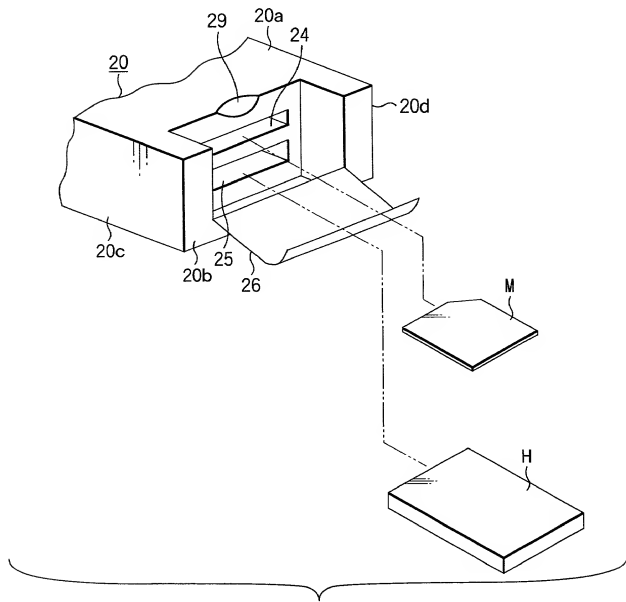
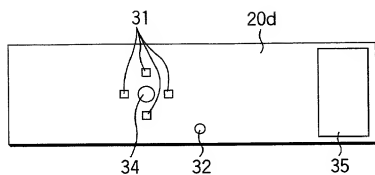


FIG. 2B

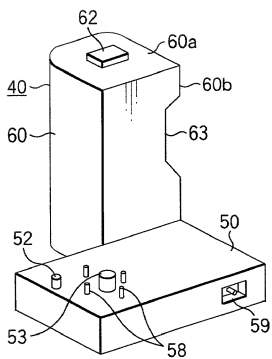


FIG. 3A

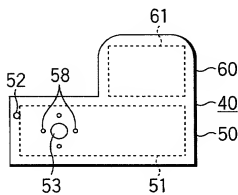


FIG. 3B

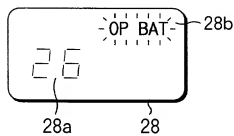
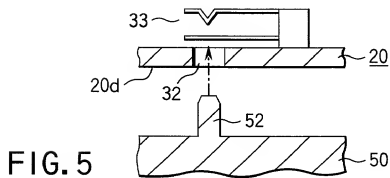
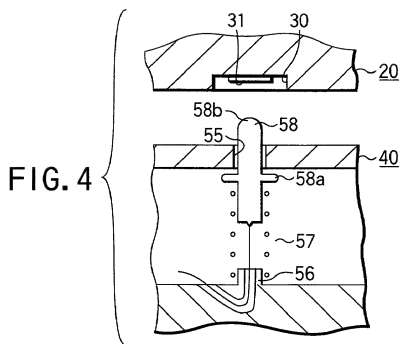


FIG. 6

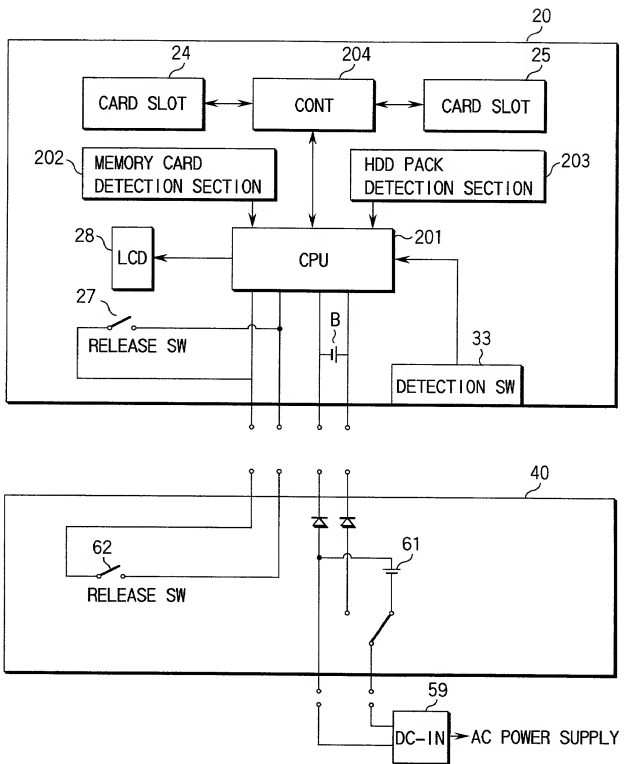


FIG. 7

```

graph TD
    START([START]) --> S1{HDD PACK  
DETECTED?  
S1}
    S1 -- YES --> S4{EXPANSION  
UNIT DETECTED?  
S4}
    S1 -- NO --> S2{MEMORY CARD  
DETECTED?  
S2}
    S4 -- YES --> S3[IMAGE SENSING  
SEQUENCE  
S3]
    S4 -- NO --> S5[LCD DISPLAY  
S5]
    S5 --> S6[INHIBIT USE OF HDD  
S6]
    S6 --> S1
    S2 -- YES --> S3
    S2 -- NO --> S1
  
```

FIG. 8

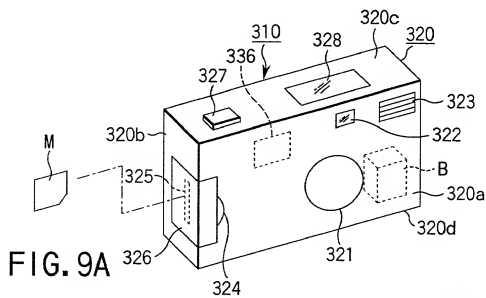


FIG. 9A

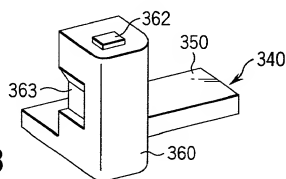


FIG. 9B

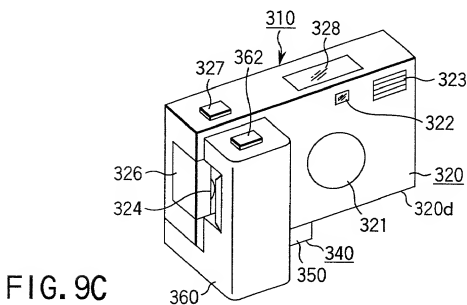


FIG. 9C

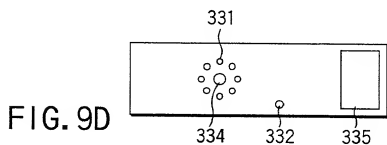


FIG. 9D

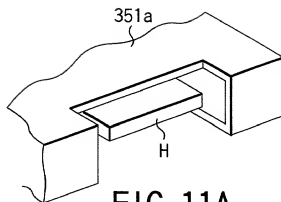


FIG. 11A

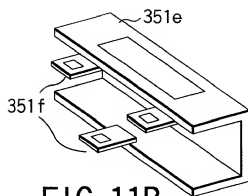


FIG. 11B

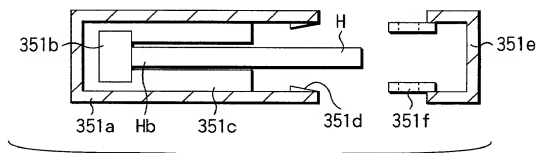


FIG. 11C

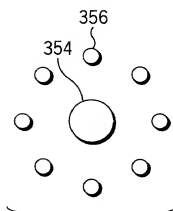


FIG. 12A

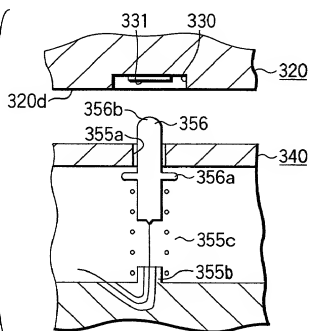


FIG. 12B

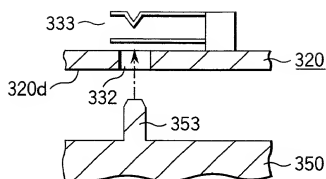


FIG. 13

FIG. 14

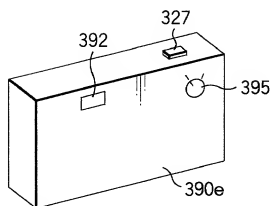
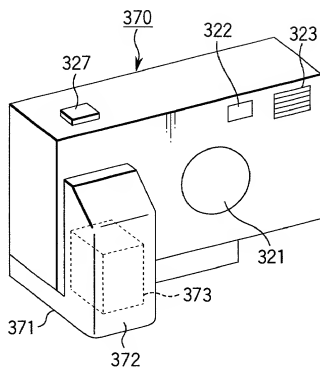


FIG. 15A

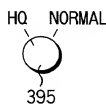
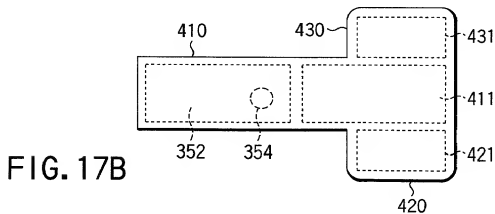
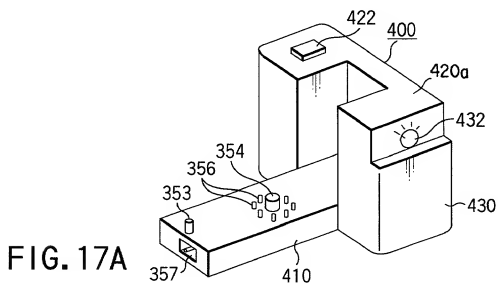
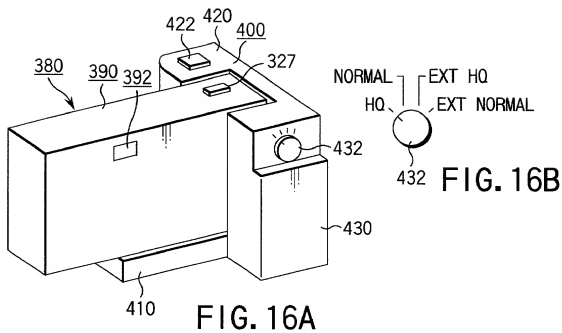


FIG. 15B



000050-11088560

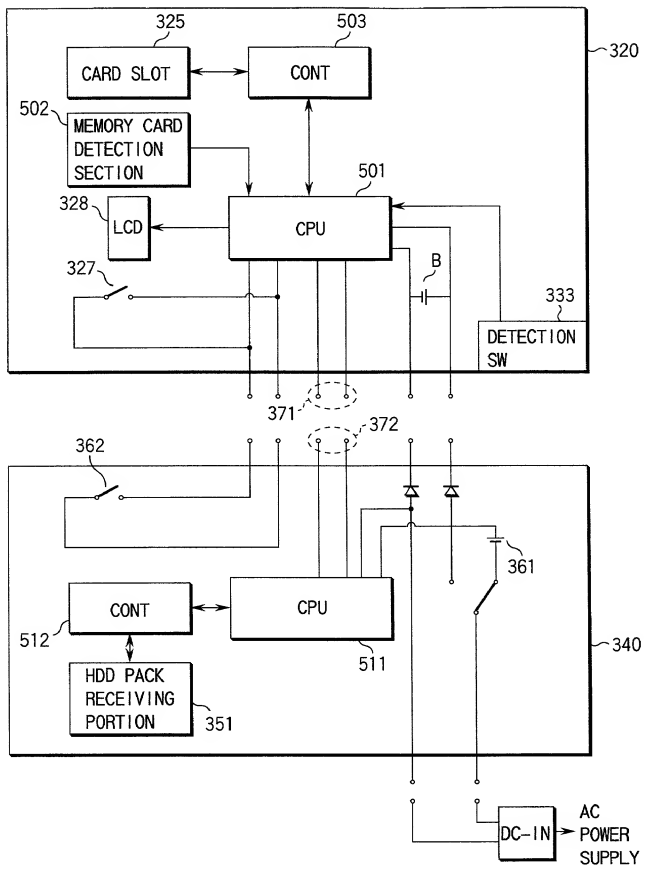


FIG. 18

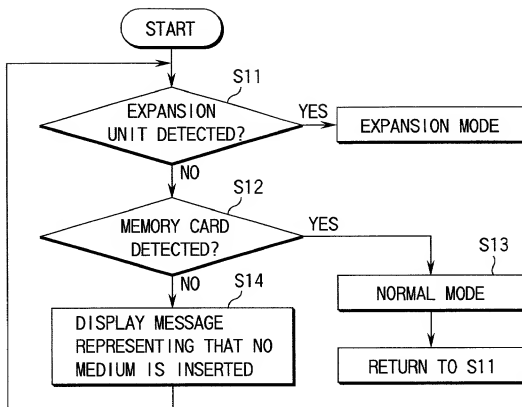


FIG. 19

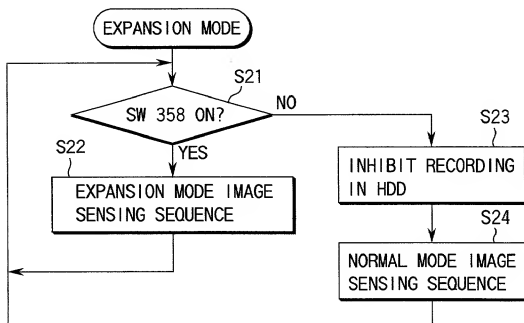


FIG. 20



FIG. 21

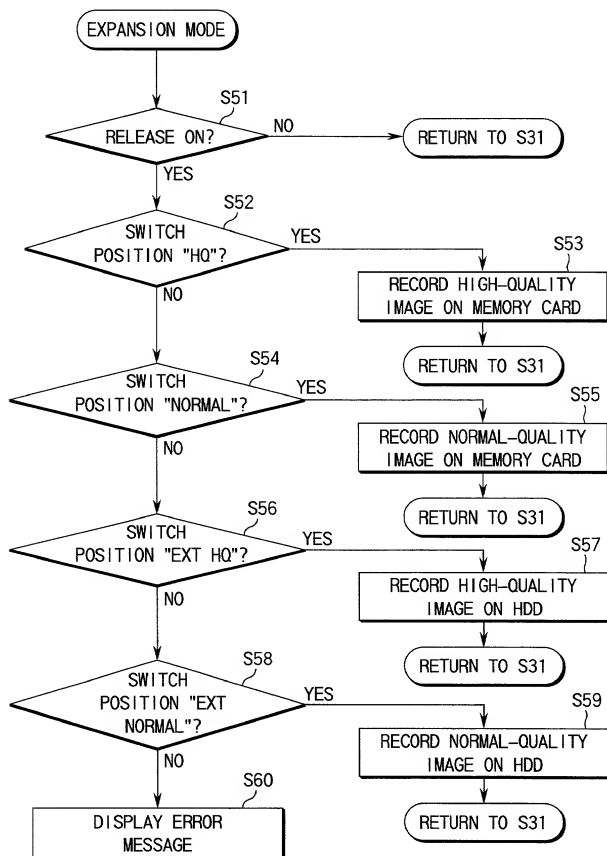


FIG. 22

Declaration Power of Attorney For Patent Application

特許出願宣言書及び委任状 Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の横に記載された通りです。

My residence, post office address and citizenship are as stated below next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

電子カメラシステム

ELECTRONIC CAMERA SYSTEM

上記発明の明細書（下記の欄で×印がついていない場合は、本書に添付）は、

The specification of which is attached hereto unless the following box is checked:

☐ 月 日に

提出され米国出願番号または特許協定条約

☐ was filed on _____ as United States Application Number or PCT international Application Number

国際出願番号を _____ とし、

_____ and was amended on _____

（該当する場合） _____ 月 _____ 日に訂正されました。

_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56

Japanese Language Declaration

(日本語宣言書)

私は、合衆国法典第35編第119条(a)-(d)項又は第365条(b)に基づき下記の、米国以外の国の少なくとも一か国を指定している特許協力条約365(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している。本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマージすること、で示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT international application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Not Claimed
優先権の主張なし

外国での先行出願

11-156557

JAPAN

03/06/1999

(Number)
(番号)

(Country)
(国名)

(Day/Month/Year Filed)
(出願年月日)

☐

11-156558

JAPAN

03/06/1999

☐

☐

☐

☐

私は、第35編米国家典119条(e)項に基いて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below

(Application No.)
(出願番号)

(Filing Date)
(出願日)

(Application No.)
(出願番号)

(Filing Date)
(出願日)

私は、下記の米国家典第35編120条に基いて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約365条(c)に基づき権利をここに主張します。また、本出願の各請求範囲の内容が米国家典第35編112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法第37編1条56項で定義された特許登録後の有無に関する重要な情報について開示義務があることを認識しています。

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(Application No.)
(出願番号)

(Filing Date)
(出願日)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

(Application No.)
(出願番号)

(Filing Date)
(出願日)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

私は、私自身の知識に基づいて本宣言書中で私が行う表明が真実であり、かつ私の入手した情報と私の信じているところに基づき表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国家典第18編1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行えば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that such willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

06530011-063000

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委任状：私は、下記の発明者として、本出願に関する一切の
 手続きを米特許商標局に対して遂行する弁理士または代理人
 として、下記の者を指名いたします。
 （弁理士、または代理人の氏名及び登録番号を明記のこと）

POWER OF ATTORNEY:As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

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Send Correspondence to
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Langer & Chick, P.C.

767 Third Avenue - 25th Floor,
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Telephone No. (212) 319-4900

Facsimile No. (212) 644-4834

Full name of sole or first inventor

唯一または第一発明者の氏名	Full name of sole or first inventor
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発明者の署名	Inventor's signature
日付	Date
	Ryuji Hirata June 5, 2000
住 所	Residence
日本国八王子市	Hachioji-shi, Japan
国 籍	Citizenship
日本	JAPAN
郵便の宛先	Post Office Address
日本国東京都八王子市久保山町2-3	c/o Intellectual Property Department OLYMPUS OPTICAL CO., LTD.
オリンパス光学工業株式会社 知的財産部内	2-3, Kuboyama-cho, Hachioji-shi, Tokyo, Japan

(第二以降の共同発明者に対しても同様に記載し、署名を
すること。)

(Supply similar information and signature for second and subsequent joint inventors.)

[illegible]

Japanese Language Declaration

(日本語宣言書)

第 2 共同発明者の氏名 (該当する場合)	Full name of 2nd Joint inventor, if any
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	Kenichi Oinoue June 5, 2000
住 所	Residence
日本国東京都	Tokyo, Japan
国 籍	Citizenship
日本	JAPAN
郵便の宛先 日本国東京都八王子市久保山町 2-3	Post Office Address c/o Intellectual Property Department, OLYMPUS OPTICAL CO., LTD.
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同第 発明者の署名 日付	Inventor's signature Date
住 所	Residence
国 籍	Citizenship
郵便の宛先	Post Office Address
第 共同発明者の氏名 (該当する場合)	Full name of Joint inventor, if any
同第 発明者の署名 日付	Inventor's signature Date
住 所	Residence
国 籍	Citizenship
郵便の宛先	Post Office Address

0553011-053000